



U.S. Department of Energy
Energy Efficiency and Renewable Energy

federal energy management program

U.S. Department of Energy Federal Energy Management Program

**FEMP DER Program Overview—
DER and CHP in Federal Facilities**

*Shawn Herrera, DOE FEMP
Barbara Ashdown, ORNL FEMP*

**Newport Beach, CA
May 14, 2003**



Presentation Outline

- FEMP's DER-CHP Strategy
- Market Assessment
- Technical Assistance
- Education and Outreach
- ADD CHP Services
- FEMP Regional Contacts



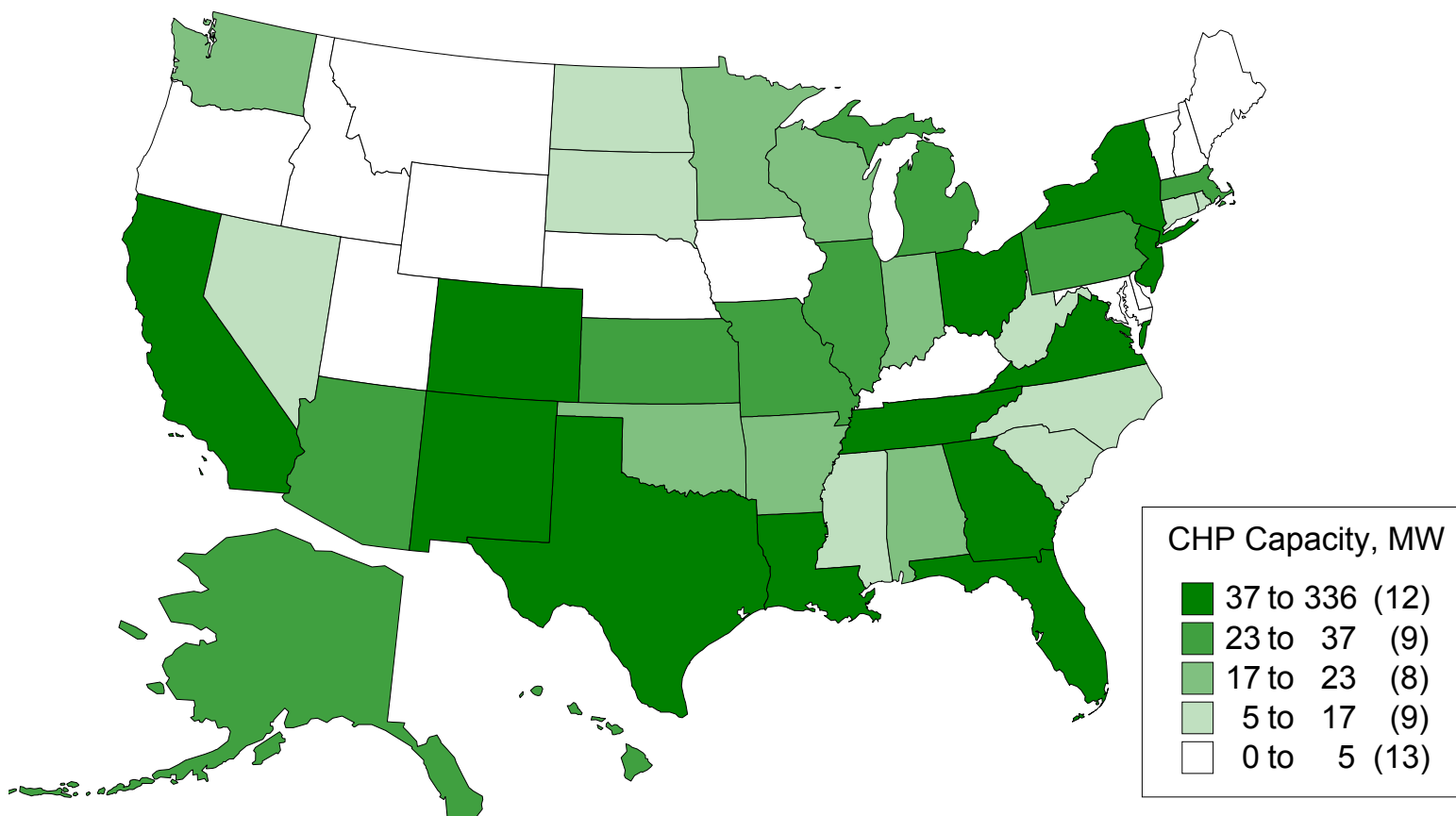
FEMP's DER-CHP Strategy

- Target assistance to address hurdles in federal sector
- Focus on markets with highest potential for success
- Help interested agencies make informed DER-CHP decisions
- Move good projects to deployment



Federal CHP Potential

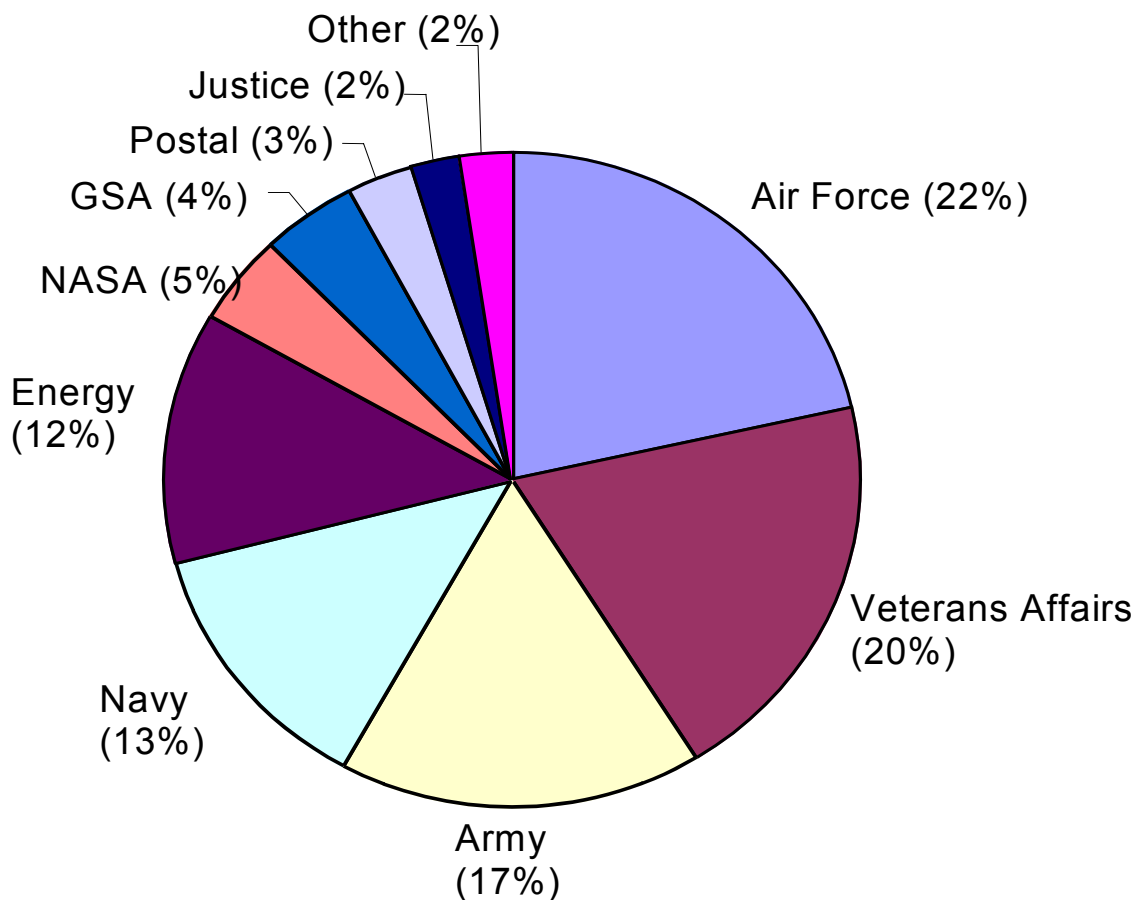
Distribution of CHP Potential at Federal Sites: Greater than 1500 MW





Federal CHP Potential

Large, energy-intensive facilities dominate





Technical Assistance

- FEMP can help agency sites
 - Determine if they have DER-CHP potential
 - Understand options with commercial technology
 - Ensure best-value configurations go into their projects
 - Help avoid surprises (e.g., exit fees)
- Agencies move forward when they are confident that claims are verified and pricing is fair and reasonable



- Case Studies
- DER “How To” Guide
- CHP Market Analysis
- Outreach Materials

Web site:

<http://www.eere.energy.gov/femp.html>



Training/Workshops

- DER Hands-on Training for Federal Energy Managers—Summer 2003, Albuquerque, NM
- Energy 2003 Conference — August 17–21, Orlando, FL
- DER at Federal Facilities Regional Workshops—Summer 2004



FEMP Assistance

Shawn Herrera (DOE/HQ)
202-586-1511
shawn.herrera@ee.doe.gov

Arun Jhaveri (Seattle)
206-553-2152
arun,jhaveri@ee.doe.gov

Melinda Latimer (Chicago)
312-886-8582
melinda.latimer@ee.doe.gov

Randy Jones (Denver)
303-275-4814
randy_jones@ee.doe.gov

Paul King (Boston)
617-565-9712
paul.king@ee.doe.gov

Ryan Paddick (Philadelphia)
215-656-6979
ryan.paddick@ee.doe.gov

Lisa Hollingsworth (Atlanta)
404-562-0569
lisa.hollingsworth@ee.doe.gov

**Barbara Ashdown/
Keith Kline (ORNL)**
**865-576-2611/
865-574-4230**
**ashdownbg@ornl.gov/
klinekl@ornl.gov**

Trina Masepohl (NREL)
303-384-7518
trina_masepohl@nrel.gov



FEMP's "ADD CHP"

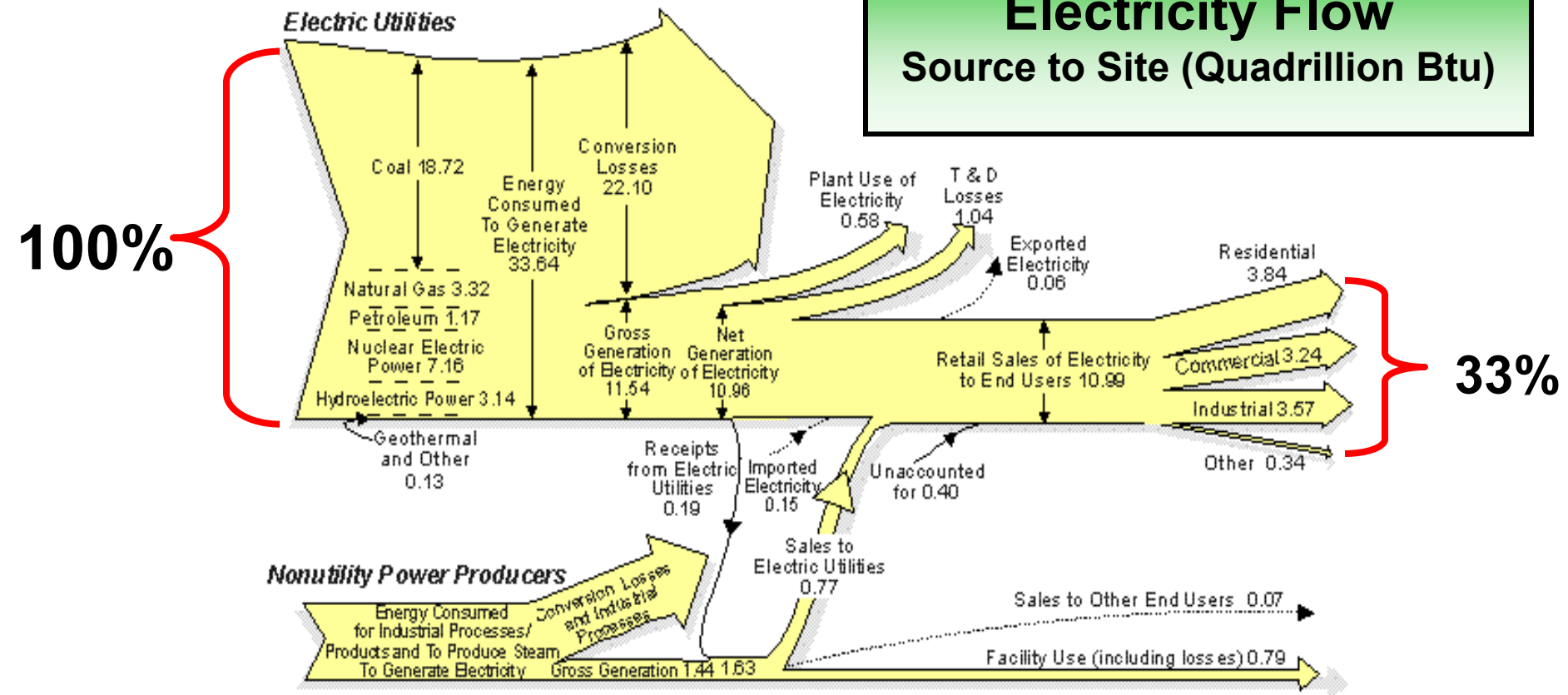
- Accelerated Development and Deployment of Combined Heat and Power (ADD CHP)
- Goal: Make proven CHP technology more easily accessible to federal agency sites who want to "lead by example" with CHP
 - Reduce costs
 - Enhance energy security & reliability
 - Reduce GHG emissions



Federal Market Drivers— Emissions Reduction

Executive Order 13123: Reduce GHG emissions 30% (from 1990) by 2010.

Electricity Flow Source to Site (Quadrillion Btu)



EIA's 1998 Annual Energy Review



Federal Market Drivers— Energy Security and Reliability

- Distribution systems (grid, pipelines) are vulnerable
- Command, communications and data centers are critical and sensitive
- Solutions include Distributed Generation and “adaptive islanding”
 - Minimize damages
 - Enable faster recovery

Source: National Academy of Science, Making the Nation Safer



FEMP's ADD CHP

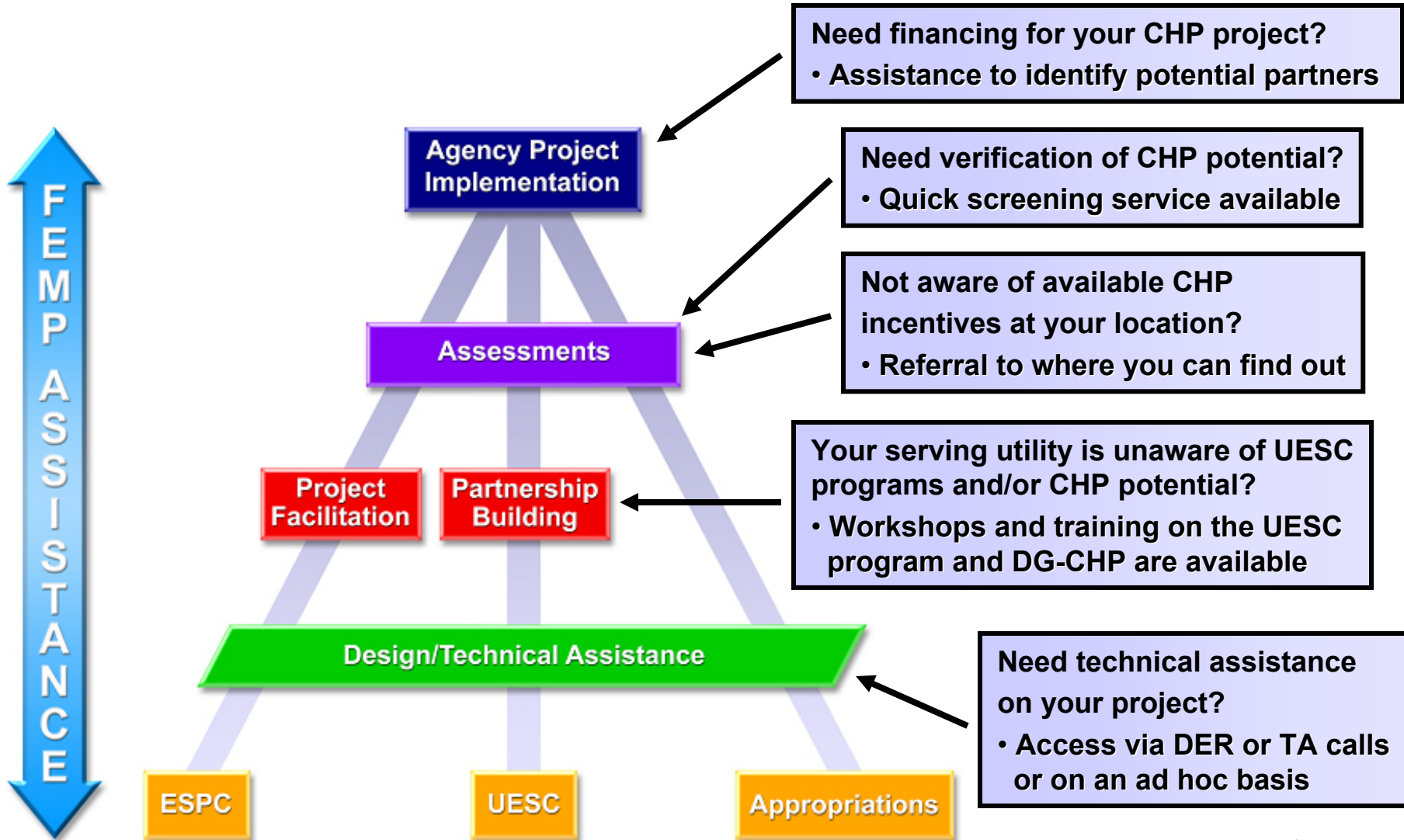
Who Does What in ADD CHP?



- Private partners do the promoting, marketing, selling, project developing, financing, implementing
 - ESCOs and Utilities
 - CHP industry & associations (USCHPA, ACEEE, IDEA, etc.)
- Federal agencies do the leading
- FEMP does the supporting
 - By providing agencies unbiased expertise they can trust, accessed through the DOE Regional Offices

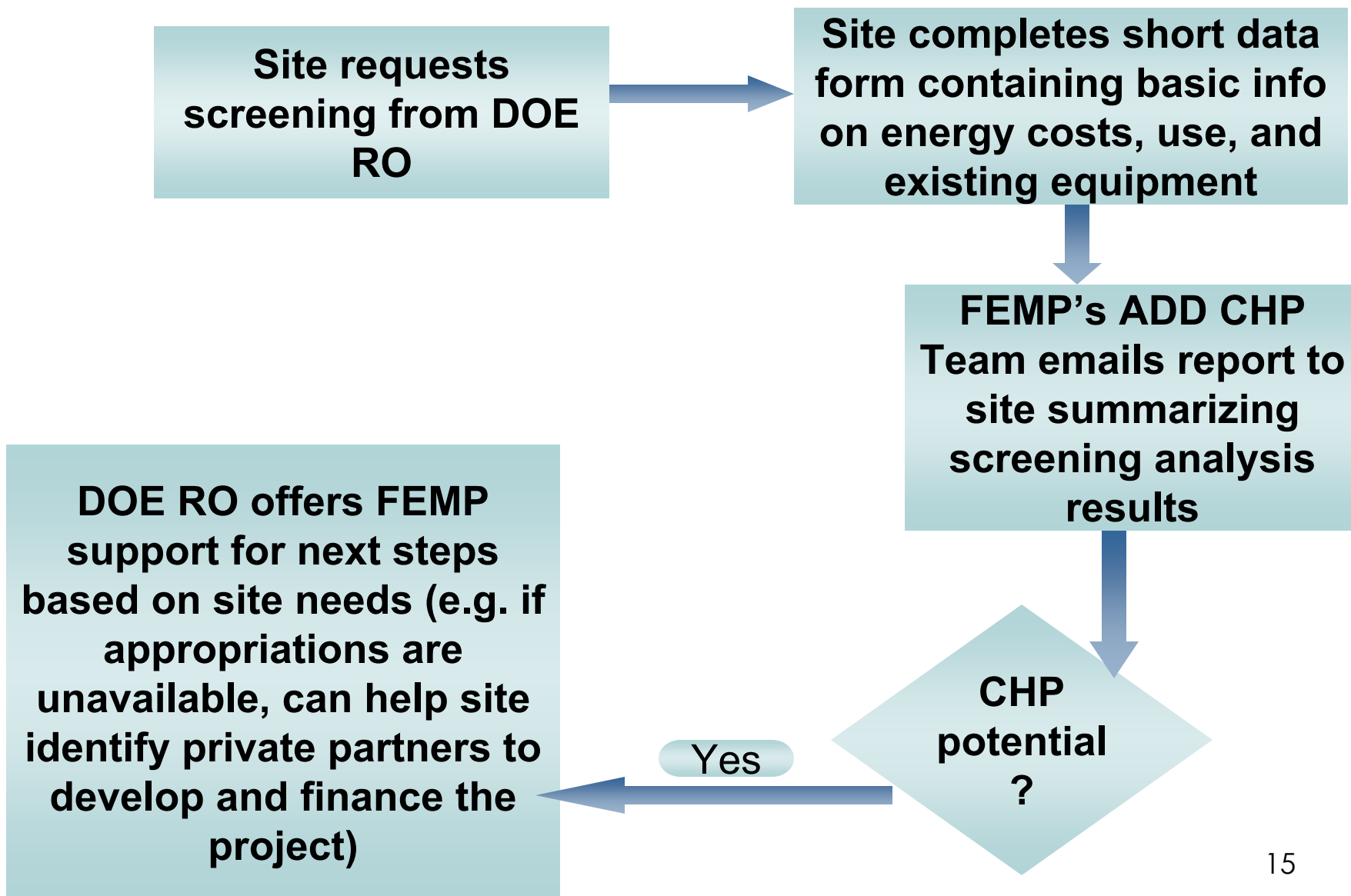


FEMP's CHP Assistance





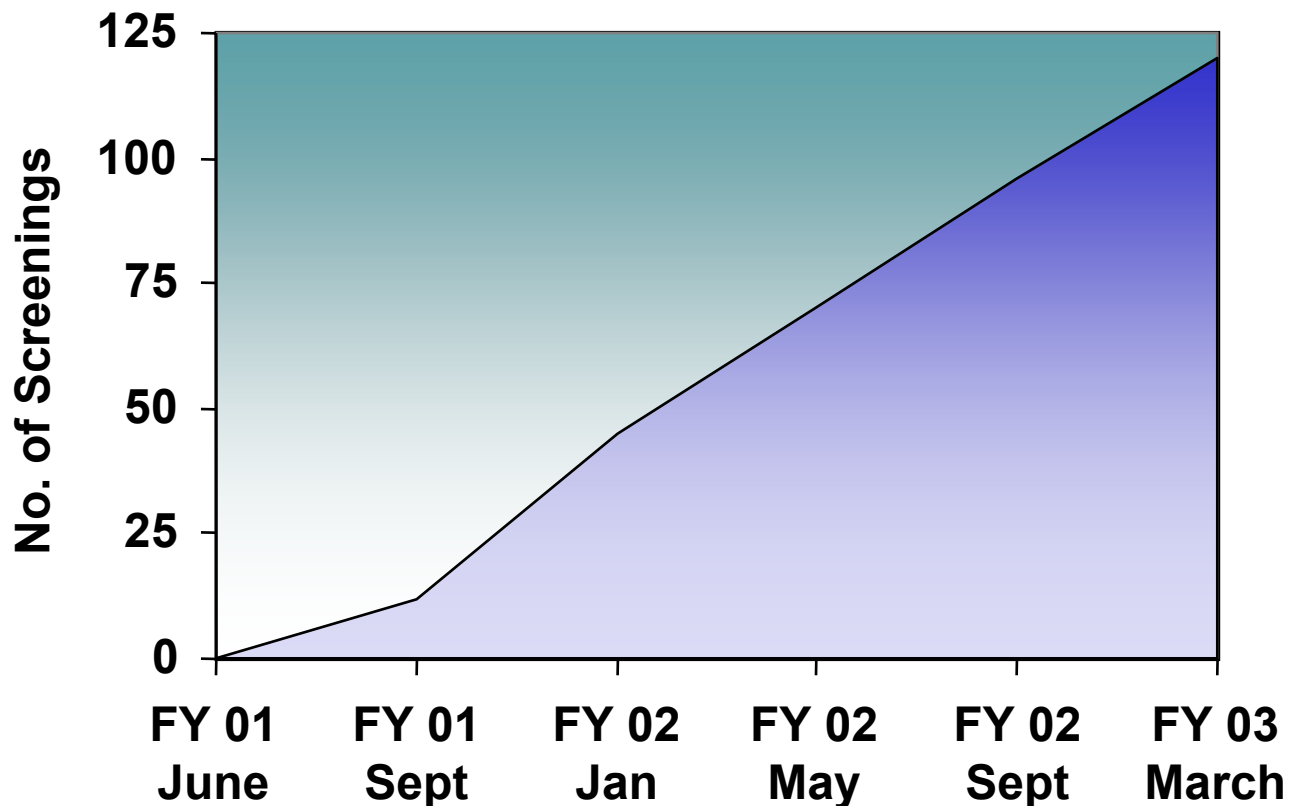
Free CHP Screenings





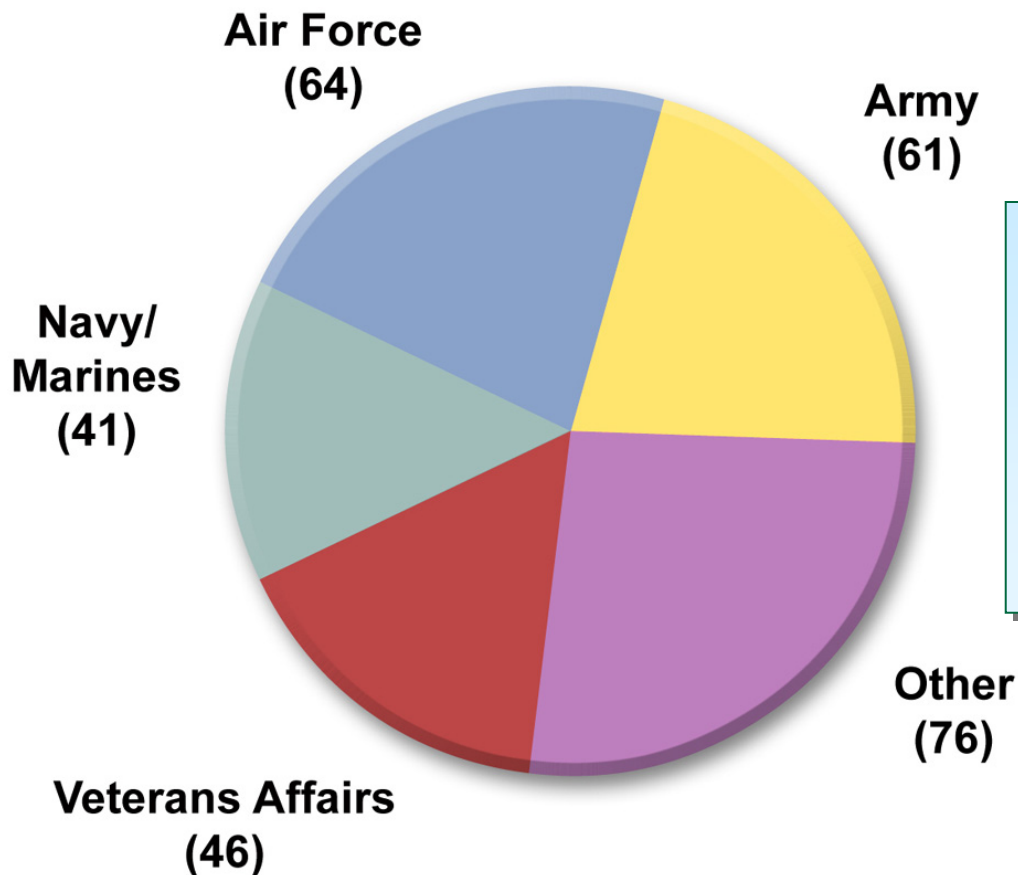
Federal Interest in CHP

Sites have requested >120 CHP screening reports.





Screening Results



**MW of CHP potential by agency, from results of screened projects with <11 years simple payback
(Total=69, ORNL 2003)**



CHP Success

Twentynine Palms Marine Corps Air Ground Combat Center

- **7.2-MW, dual-fuel cogen system; inaugurated 2/2003 — energy security a primary driver**
- **Annual cost savings: \$5.8M**
- **Savings subsidized >1 MW of PV**
- **75% efficiency (design target)—twice U.S. grid average**
- **Exhaust for district hot water and 200-ton chiller**
- **FEMP support catalyzed efforts, contributed to more efficient design**





Fort Jackson, South Carolina

- **Chronology of events reflects overall FEMP support**
 - ✓ **Screening performed (1/02); revised (4/02)**
 - ✓ **Site champion attended DER workshop (5/02)**
 - ✓ **Site requested and was awarded technical assistance (7/02)**
 - ✓ **Site visited for level II analysis and to meet with potential ESCO (9/02)**
 - ✓ **TRNSYS analysis performed for 13 CHP configurations to gain ESCO buy-in (10–12/02) (continuous, peak shaving, and extended peak shaving modes of operation; different sizes, types of prime drivers)**
 - ✓ **ESCO submits initial proposal (4/03)**





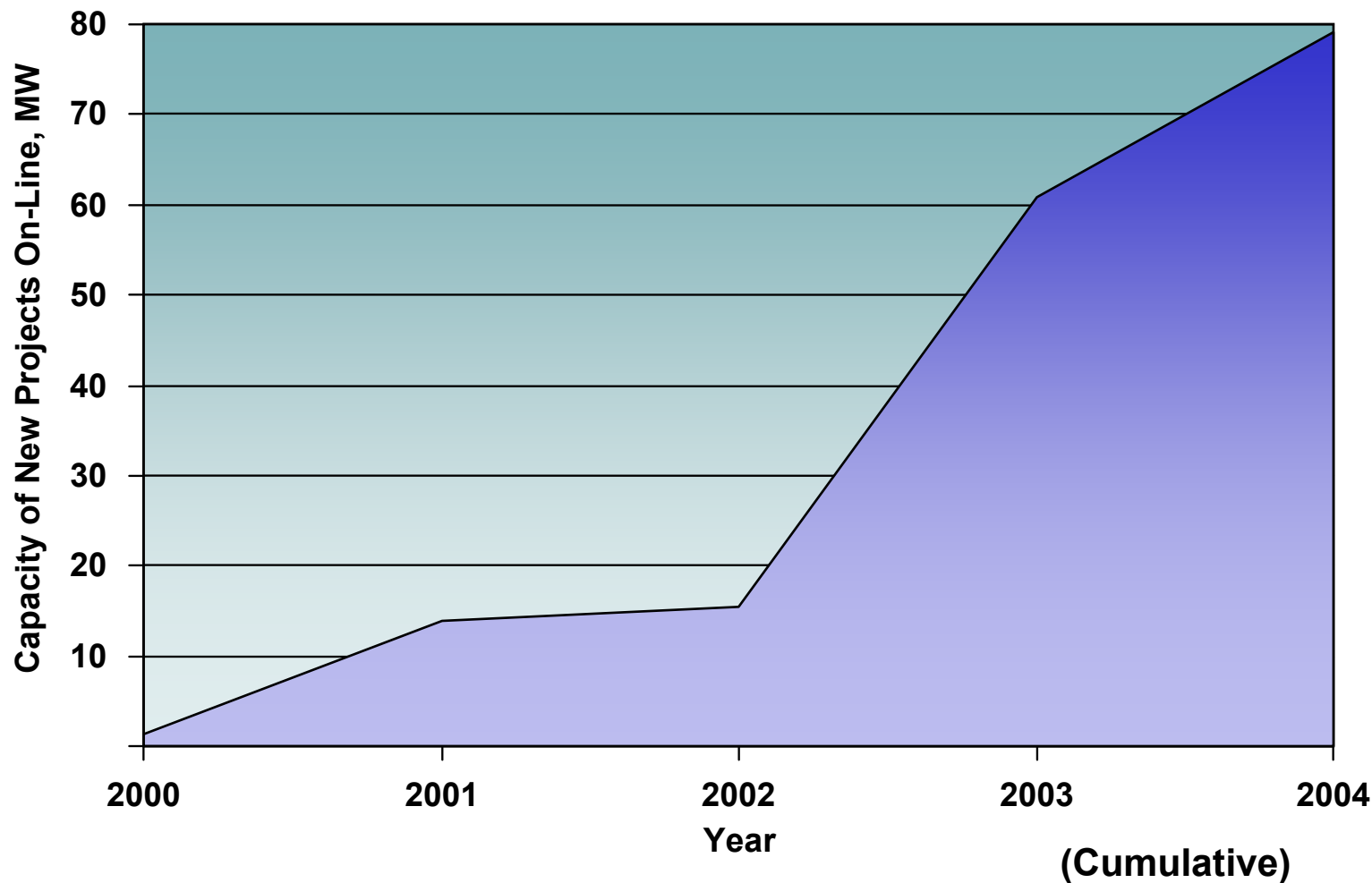
Federal Adoption of CHP

What Have We Learned?

- Potential savings from systems are significant
- Savings from CHP can “subsidize” renewables
- Strongest market drivers for CHP are energy security, equipment upgrades, and cost savings, not energy or emissions savings.



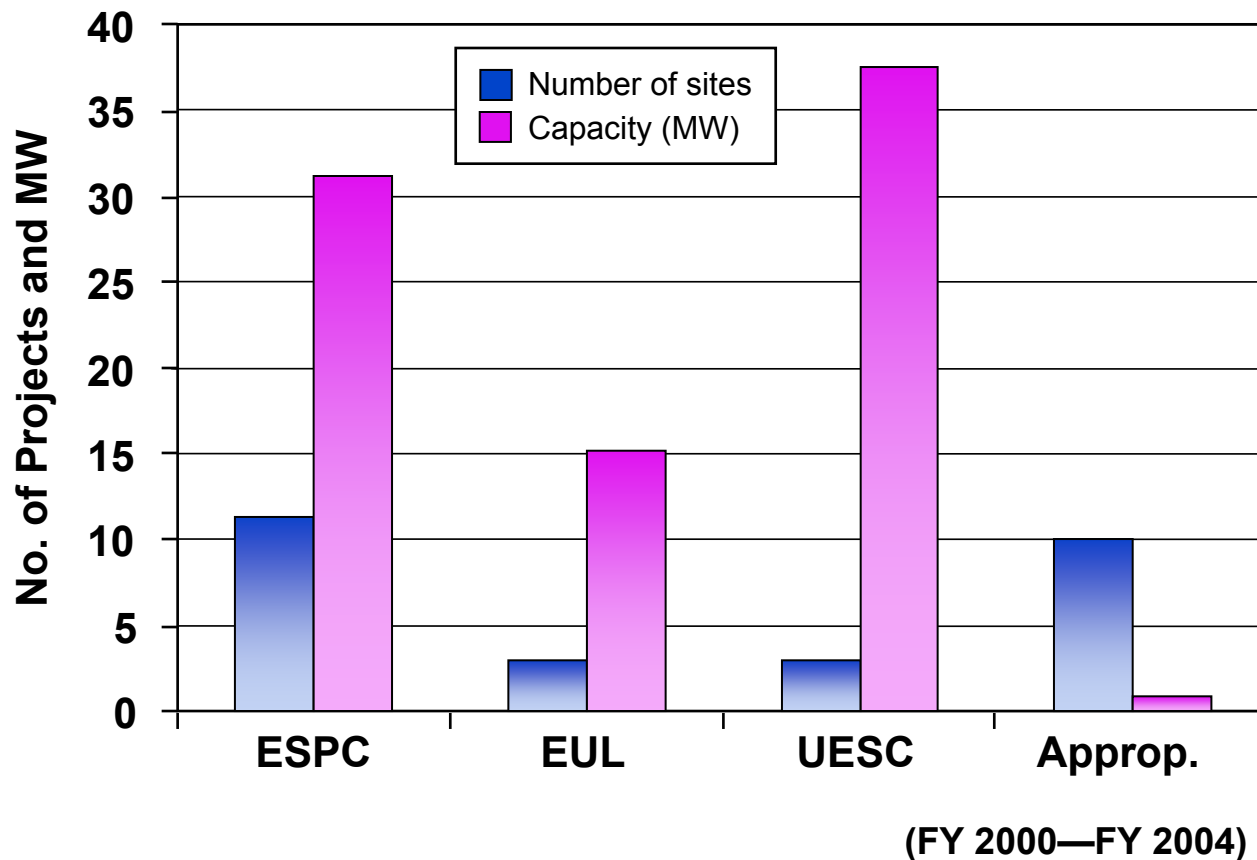
CHP Project Size and Benefits are Growing





Funding CHP

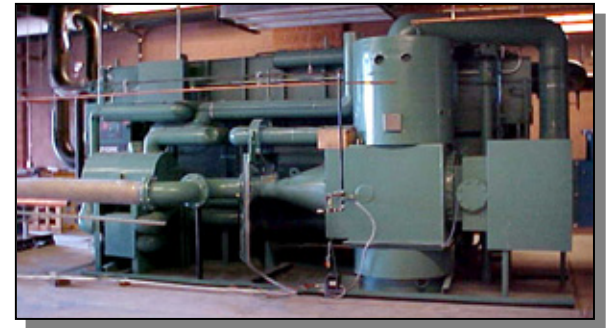
Funding Mechanisms for CHP Being Installed





CHP Technical Lessons

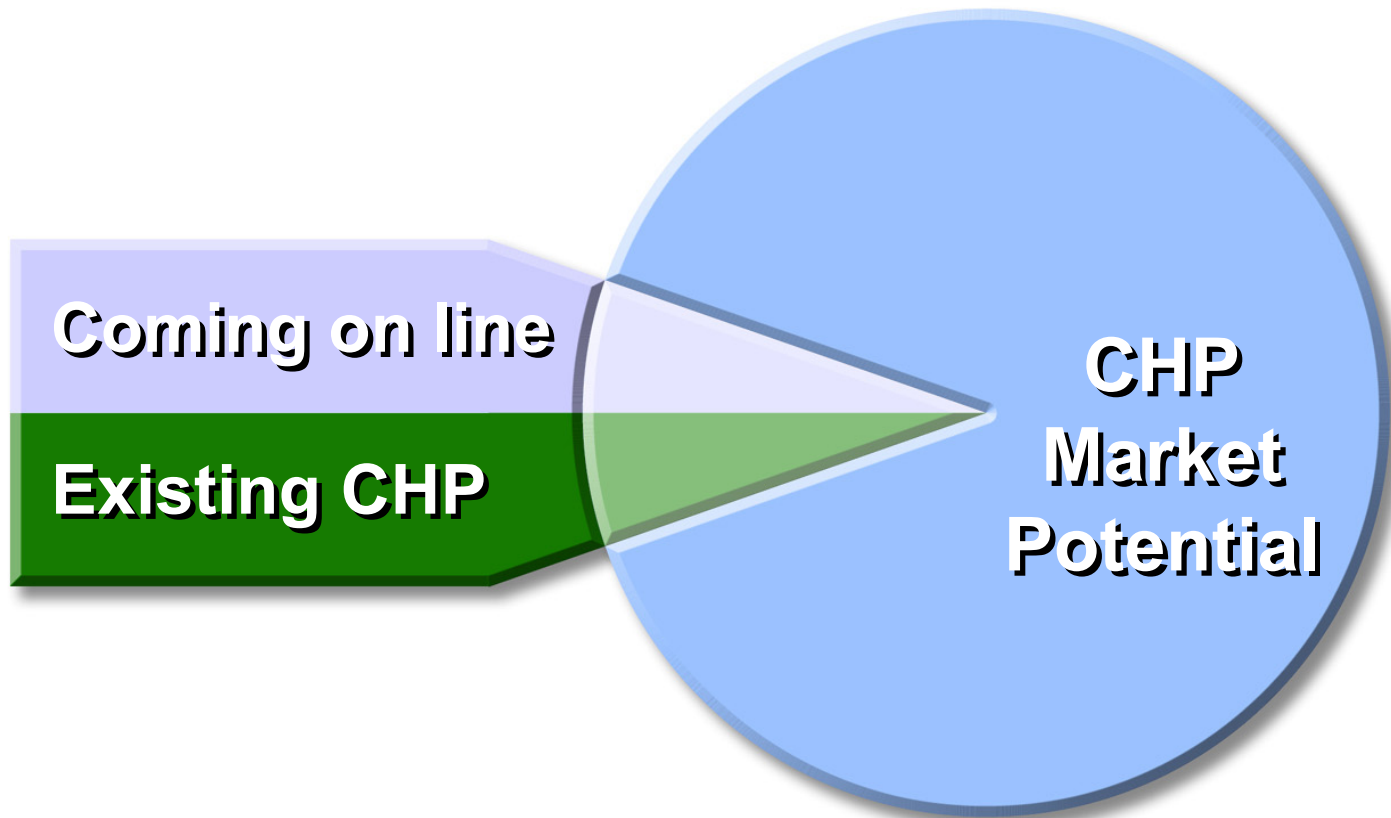
- **IC engines, large gas turbines — tried and true**
- **Gas compressors and peripherals for microturbines—varied results**
- **Control of exhaust for direct-fired absorption chillers —presents challenges**
- **Absorption chiller —maintenance and efficiency issues**
- **Fuel cells— appealing but costly**





Federal Adoption of CHP

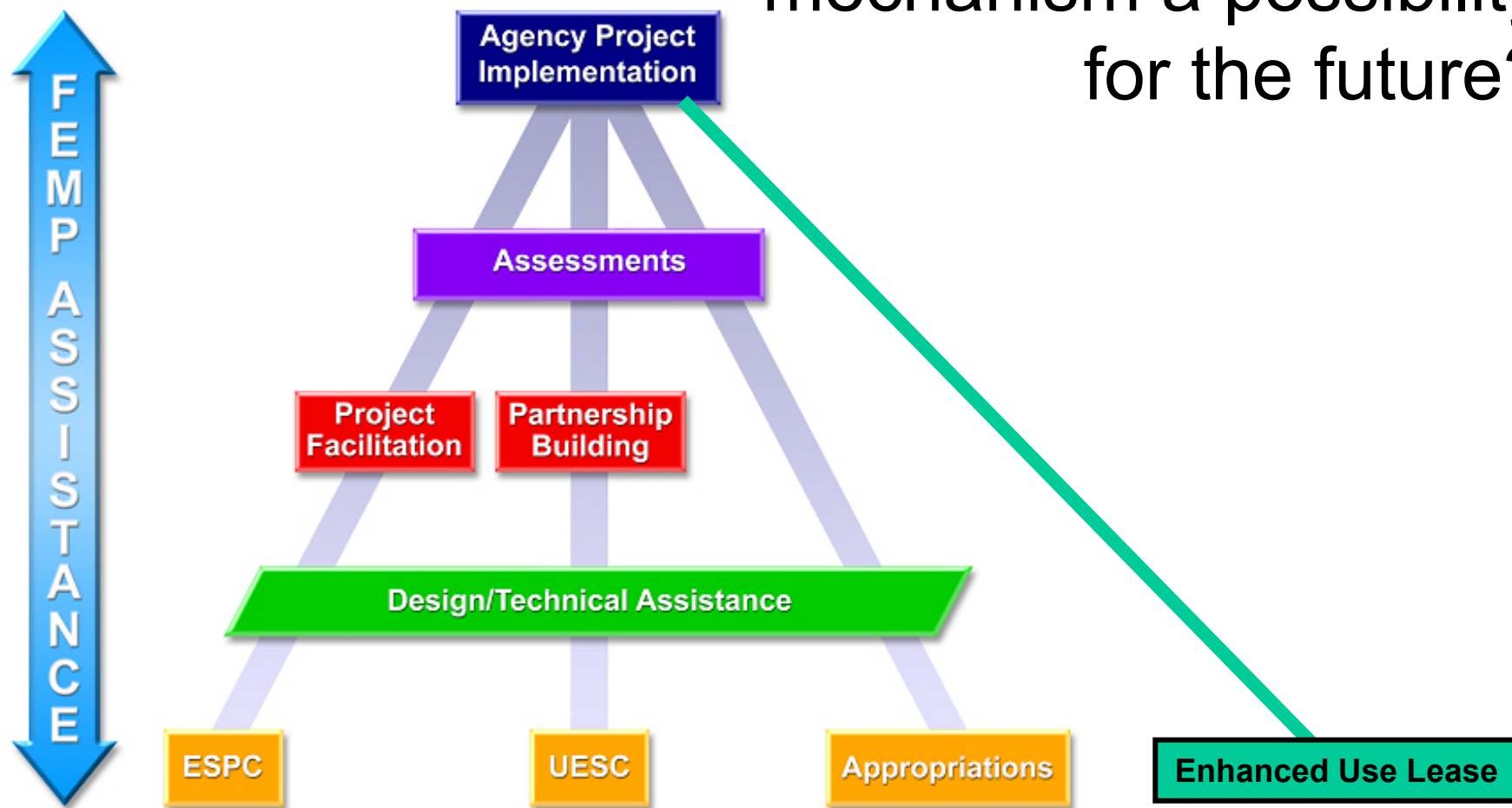
Currently Only a Fraction of Total Potential





CHP: Looking Forward

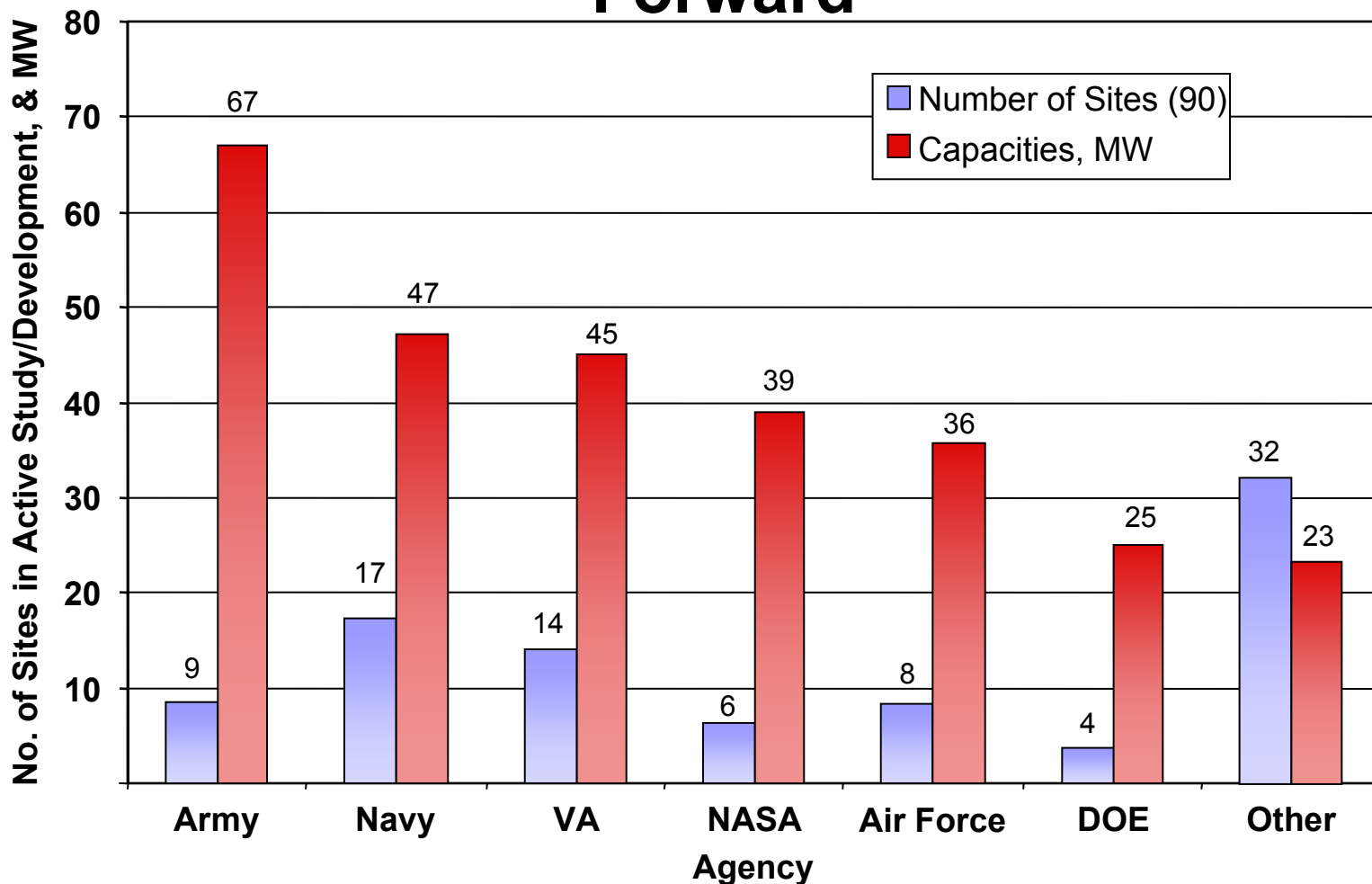
Is special CHP tech-specific mechanism a possibility for the future?





CHP and FEMP

With FEMP Support, CHP Projects are Moving Forward





FEMP's ADD CHP

If issue is technical, agencies can access ADD CHP via FEMP TA staff at DOE Regional Offices.

Arun Jhaveri (Seattle)
206-553-2152
arun,jhaveri@ee.doe.gov

Ryan Paddick (Philadelphia)
215-656-6979
ryan.paddick@ee.doe.gov

Melinda Latimer (Chicago)
312-886-8582
melinda.latimer@ee.doe.gov

Lisa Hollingsworth (Atlanta)
404-562-0569
lisa.hollingsworth@ee.doe.gov

Randy Jones (Denver)
303-275-4814
randy_jones@ee.doe.gov

Shawn Herrera (DOE/HQ)
202-586-1511
shawn.herrera@ee.doe.gov

Paul King (Boston)
617-565-9712
paul.king@ee.doe.gov

Barbara Ashdown (ORNL)
865-576-2611
ashdownbg@ornl.gov



FEMP's ADD CHP

If issue is financing, agencies can access ADD CHP via FEMP AFR staff at DOE Regional Offices.

Scott Wolf (Seattle)
206-553-1004
scott.wolf@ee.doe.gov

Tom Hattery (Philadelphia)
215-656-6955
thomas.hattery@ee.doe.gov

Gordon Drawer (Chicago)
312-886-8572
gordon.drawer@ee.doe.gov

Doug Culbreth (Atlanta)
919-870-0051
carson.culbreth@ee.doe.gov

Sharon Gill (Denver)
303-275-4846
sharon.gill@ee.doe.gov

Tatiana Strajnic (DOE/HQ)
202-586-9230
tatiana.strajnic@ee.doe.gov

David Mark (Boston)
617-565-9712
david.mark@ee.doe.gov

Keith Kline (ORNL)
865-574-4230
klinekl@ornl.gov